

CLAIMS

What is claimed is:

1. A dual-type organic electroluminescence (EL) display comprising:
a main organic EL device comprising:
a main substrate,
strip-shaped main substrate scan lines,
a main substrate organic light-emitting portion, and
main substrate data lines formed on the main substrate;
a sub organic EL device opposite to and facing the main organic EL device, comprising:
a sub substrate,
strip-shaped sub substrate scan lines,
a sub substrate organic light-emitting portion, and
sub substrate data lines formed on the sub substrate;
a sealant comprising a conductive spacer, sealing the main and sub substrates and hermetically sealing the main and sub substrate organic light-emitting portions in a state in which the main and sub organic EL devices face each other; and
at least one flexible printed cable (FPC) formed on the main or sub substrate and connected to electrode lines of the main and/or sub substrates.
2. The dual-type organic EL display of claim 1, wherein the main substrate scan lines and the main substrate data lines are arranged on the main substrate, the sub substrate scan lines and the sub substrate data lines are arranged on the sub substrate, and the sealant is interposed between the main and sub substrate scan lines and between the main and sub substrate data lines.
3. The dual-type organic EL display of claim 2, wherein the main substrate scan lines are electrically connected to the sub substrate scan lines by the conductive spacer.
4. The dual-type organic EL display of claim 3, wherein the at least one FPC comprises an FPC for single substrate scan lines electrically connected to the main or sub substrate scan lines, and transmitting a drive signal to the main or sub substrate scan lines.

5. The dual-type organic EL display of claim 2, wherein the main substrate data lines are electrically connected to the sub substrate data lines by the conductive spacer.

6. The dual-type organic EL display of claim 5, wherein the at least one FPC comprises an FPC for single substrate data lines electrically connected to the main or sub substrate data lines, and transmitting a drive signal to the main or sub substrate data lines.

7. The dual-type organic EL display of claim 2, wherein the main substrate scan lines are electrically connected to the sub substrate scan lines by the conductive spacer.

8. The dual-type organic EL display of claim 7, wherein the at least one FPC comprises an FPC for single substrate scan lines electrically connected to the main or sub substrate scan lines, and transmitting a drive signal to the main or sub substrate scan lines.

9. The dual-type organic EL display of claim 7, wherein the at least one FPC comprises an FPC for main substrate data lines electrically connected to the main substrate data lines, and transmitting a drive signal to the main substrate data lines.

10. The dual-type organic EL display of claim 7, wherein the at least one FPC comprises an FPC for sub substrate data lines electrically connected to the sub substrate data lines, and transmitting a drive signal to sub substrate data lines.

11. The dual-type organic EL display of claim 2, wherein the at least one FPC comprises FPCs for main substrate scan and data lines connected to the main substrate scan and data lines, respectively, and FPCs for sub substrate scan and data lines connected to the sub substrate scan and data lines, respectively.

12. The dual-type organic EL display of claim 1, wherein the main substrate scan lines are grouped at a first side of the main substrate and the main substrate data lines are arranged at a second side of the main substrate.

13. The dual-type organic EL display of claim 12, wherein the sub substrate scan lines are arranged on the sub substrate parallel to the main substrate scan lines, and the sub substrate data lines are arranged on the sub substrate parallel to the main substrate data lines.

14. The dual-type organic EL display of claim 1, wherein the conductive spacer comprises an anisotropic conductive material which is electrified vertically and insulated horizontally.

15. The dual-type organic EL display of claim 1, wherein the main substrate scan lines and the sub substrate scan lines are electrically connected to each other by the conductive spacer, and are connected to the FPC applying an identical scan line drive signal to the main substrate scan lines and the sub substrate scan lines.

16. The dual-type organic EL display of claim 1, wherein the main substrate data lines and the sub substrate data lines are electrically connected to each other by the conductive spacer, and are connected to the FPC applying an identical data line drive signal to the main substrate data lines and the sub substrate data lines.

17. A dual-type organic electroluminescence (EL) display comprising:
a main organic EL device comprising:
 a main substrate,
 strip-shaped main substrate scan lines,
 a main substrate organic light-emitting portion, and
 main substrate data lines formed on the main substrate;
a sub organic EL device opposite to and facing the main organic EL device, comprising:
 a sub substrate,
 strip-shaped sub substrate scan lines,
 a sub substrate organic light-emitting portion, and
 sub substrate data lines formed on the sub substrate;
a sealant comprising a conductive spacer, sealing the main and sub substrates and hermetically sealing the main and sub substrate organic light-emitting portions in a state in which the main and sub organic EL devices face each other;

floating electrode lines formed on the main or sub substrate and connected to electrode lines on the remaining main or sub substrate; and

at least one flexible printed cable (FPC) connected to the main and/or sub substrate;

wherein a plurality of the electrode lines on the main and sub substrates are electrically connected to each other by the conductive spacer.

18. The dual-type organic EL display of claim 17, wherein the floating electrode lines are independently arranged at a first side of the main or sub substrate electrode lines.

19. The dual-type organic EL display of claim 18, wherein a pitch between each of the main or sub substrate electrode lines formed on the substrate with the floating electrode lines is smaller than that between each of the electrode lines formed on the substrate without the floating electrode lines.

20. The dual-type organic EL display of claim 17, wherein the conductive spacer comprises an anisotropic conductive material which is electrified vertically and insulated horizontally.

21. The dual-type organic EL display of claim 17, wherein the main substrate electrode lines and the sub substrate electrode lines electrically connected to each other are connected to the at least one FPC.

22. A method of manufacturing a dual-type organic EL display comprising:
preparing a main organic EL device by forming main substrate scan lines, a main substrate insulating layer, a main substrate organic layer, and main substrate data lines crossing the main substrate scan lines on a transparent main substrate;

preparing a sub organic EL device by forming sub substrate scan lines, a sub substrate insulating layer, a sub substrate organic layer, and sub substrate data lines crossing the sub substrate scan lines on a transparent sub substrate;

aging the main and sub organic EL devices;

sealing along the periphery of an effective display area to hermetically seal the main and sub organic EL devices so as not to be exposed outside, wherein the sealant comprises a conductive spacer; and

connecting flexible printed cables (FPCs) transmitting a drive signal to at least one of the main and sub substrate scan lines and/or at least one of the main and sub substrate data lines electrically connected to each other by the sealant.

23. The method of claim 22, wherein the conductive spacer is interposed between each of the main and sub substrate scan lines and/or the main and sub substrate data lines, forming the electrical connection there between.

24. The method of claim 22, wherein in the connecting of the FPCs, the electrically connected main and sub substrate scan lines or main and sub substrate data lines are connected to FPCs on one of the main and sub substrates.

25. A dual-type organic electroluminescence (EL) display comprising:
a main organic EL device with a first light-emitting portion;
a sub organic EL device with a second light-emitting portion;
a sealing unit with a conductive spacer in the sealing unit; and
at least one flexible printed cable (FPC) coupled to the main or sub organic EL device;
wherein the sealing unit hermetically seals the light-emitting portions facing each other, with the conductive spacer providing an electrical connection between the main and sub organic EL devices, and signals from the at least one FPC are provided directly to one of the devices, and through the conductive spacer to the remaining device.

26. A dual-type organic electroluminescence (EL) display comprising:
a main organic EL device with a first light-emitting portion;
a sub organic EL device with a second light-emitting portion;
electrode lines formed on each of the EL devices;
floating electrode lines formed on the main or sub EL device;
a sealing unit; and
at least one flexible printed cable (FPC) coupled to the main or sub organic EL device;
wherein the floating electrode lines send signals received from the at least one FPC to a plurality of the electrode lines on the device not having the floating electrode lines.

27. The dual-type organic EL display of claim 26, further comprising a conductive spacer in the sealing unit, wherein a plurality of the electrode lines of each device are electrically connected to each other through the conductive spacer.

28. The dual-type organic EL display of claim 27, wherein the electrically connected electrode lines of one of the devices receives signals from the at least one FPC coupled to the other device.